

New Facility Will Rehabilitate Sewage Sludge



DEDICATION — Senator Schmitt (with hard hat), Jack Sivinski (at right), and SIDSS (Sandia Labs Irradiator for Dried Sewage Solids) got together last week for the facility's dedication. The Senator was principal speaker. Jack heads Applied Biology & Isotope Utilization Division 4535, the group responsible for the project.

Construction will soon be complete on the Sandia Laboratories Irradiator for Dried Sewage Solids (SIDSS), a pilot facility to explore the economic and scientific aspects of irradiating dried or composted sewage sludge so that it can be used as a soil additive, crop fertilizer, or animal feed supplement.

The \$350,000 facility was dedicated Oct. 19. The dedication included an address by New Mexico's U.S. Senator Harrison Schmitt. A seminar on gamma irradiation of sludge was also held.

SIDSS, the first facility capable of handling several tons of dry sludge daily on a flow-through basis, is planned as a forerunner to a full-scale irradiation plant to be built in the eastern United States.

Work at SIDSS is part of Sandia's Beneficial Uses Program, jointly sponsored by the Department of Energy and the Environmental Protection Agency. A major goal is to develop uses for two forms of waste — municipal sewage sludge and radioactive isotopes, such as cesium-137, contained in nuclear waste.

About five million tons of sludge, a mud-like substance composed chiefly of solids that settle out of raw liquid sewage, are generated yearly in the U.S. Sludge contains nutrients such as carbohydrates and protein, pathogens — parasite eggs, viruses, bacteria — and, in some industrial areas, hazardous amounts of heavy metals and toxic chemicals.

(Sandia's program to eliminate the pathogens with gamma radiation does not reduce

(Continued on Page Four)

LAB NEWS

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SANDIA LABORATORIES • ALBUQUERQUE NEW MEXICO • LIVERMORE CALIFORNIA • TONOPAH NEVADA

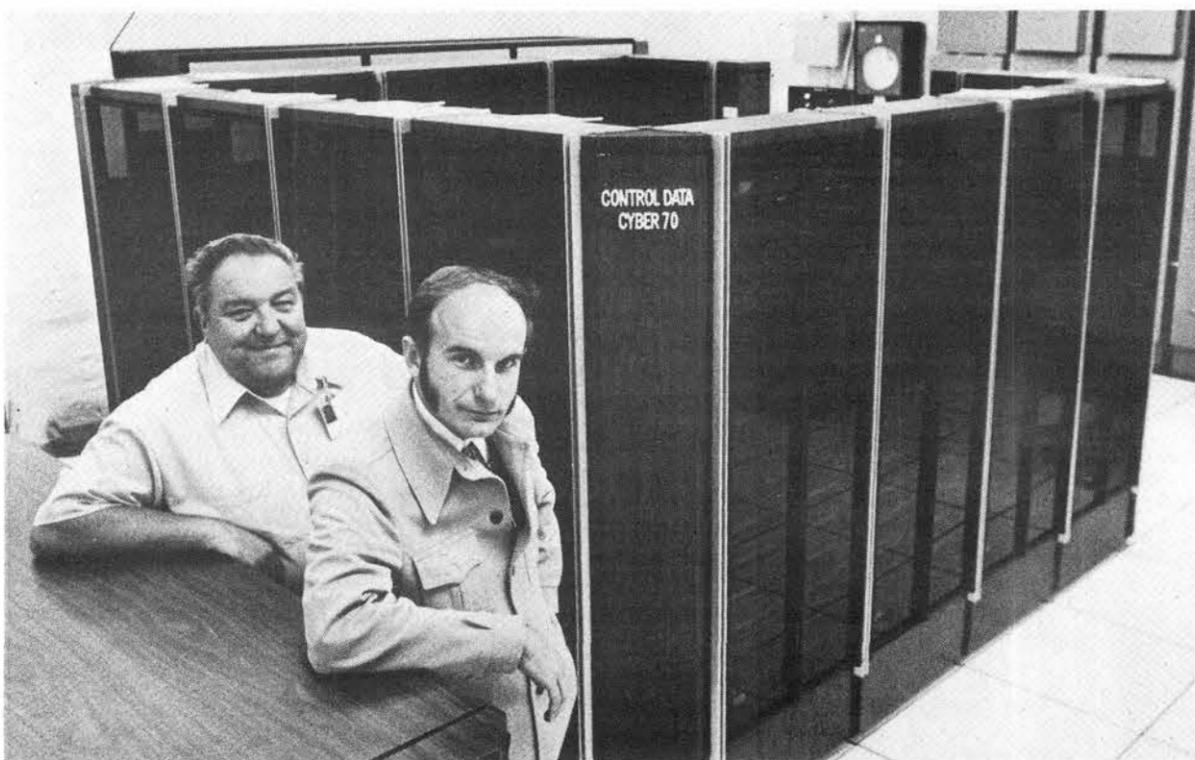
'78 Payroll Figures Announced

The Sandia Laboratories payroll for fiscal year 1978 (which ended September 30) amounted to \$134.2 million at Sandia Laboratories Albuquerque, and \$21.8 million at Sandia Laboratories Livermore. For FY '77, these figures were \$122.6 million for Albuquerque and \$19.3 million for Livermore. Salaries of some 80 Sandia employees at Nevada Test Site and Tonopah Test Range are included in the Albuquerque figure.

At the end of FY '78 there were 7,478 on roll at Sandia Labs including 1,008 at Livermore. The total is about 215 more than at the end of FY '77.

Assets of the Department of Energy's installations operated by Sandia totaled \$397.8 million at the end of FY '78, compared to \$368.2 million in FY '77. These figures represent undepreciated value of buildings and facilities at Albuquerque, Livermore and Tonopah Test Range.

Purchases by Sandia in New Mexico amounted to \$60.3 million for FY '78. More than 98 percent of the amount, or \$59.4 million, went to Albuquerque firms.



NEW COMPUTER — Now operational as part of Sandia's Scientific Computing Network is this Control Data Cyber 76. A Class IV machine, the new computer is faster and has a greater capacity than the CDC 6600 which it replaces. The Network now uses this machine, a CDC 7600, two CDC 6600's with extended core storage and various peripheral machines. Jack Westbrook (2631), left, directs operations of the Network; Paul Lemke (2641) supervises software.

Afterthoughts

TV & the press--A curious phenomenon is the obsessive interest of the print media in TV ratings, especially those pertaining to network news programs. We see story after story about Barbara Walters and how she bombed/triumphed (take one) on such and such an interview, or why Harry Reasoner left ABC and what CBS thinks of him, and so on ad infinitum, ad nauseam. Does anyone really care? The subject has about as much interest inherent in it as, say, a discussion of the relative merits of the New York Times' homemaker's column and that of the Washington Post. If you are a media person, you might have some professional interest in these rankings and comparisons, but why foist them on the public?

As for the endless copy on the relative standings of the various and mindless dramatic shows, well that's about like examining the titillation quotient of Dick Tracy vs Peanuts. The newspapers' focus here reveals their perceived sense of inferiority to TV--they're like the poor folk ogling the rich and cackling over their antics.

Reading revival--From Albuquerque High our son brought home an interesting communication from the principal to all parents: "I would like to remind all of our community that we will be initiating our Sustained Silent Reading (SSR) program this year. The program calls for a block of time--9:03 to 9:23--to be devoted exclusively to the purpose of reading. Everyone (including the administrators, custodians, etc.) will be required to read during this time period." For some, 20 minutes of sustained reading will be cruel and unusual and parents may object, but we say hang in there SSR!

"The fact that a child might be somewhat bored during the learning process seems to me a flabby excuse for not teaching. . . . I can't accept the theory that learning has to be fun. If it is fun, so much the better. Certainly it can be fun. Equally certainly, learning can be tedious. But even when it is drudgery, learning something and understanding what has been gained on the way brings a sense of satisfaction that frequently leads to a desire for further achievement, however painful the process."

Thomas Middleton, Saturday Review

*js

Supervisory Appointment



AL SMAILER to supervisor of the newly-created Standards-Planning Division 3615, effective Oct. 16. Since coming to Sandia in May 1959, Al has worked in supplier evaluation, manufacturing development engineering and value engineering. Since 1969 he has been a maintenance staff engineer and coordinator for the five-year maintenance apprenticeship program. Al has been certified by the Methods Time Measurement (MTM) Association for Standards in Research. In his new job, he will use the MTM technique for measuring and planning maintenance work.

Al earned a BS in industrial engineering from Georgia Tech. He was an adjunct professor of ME at UNM for one year, is a past president of the New Mexico Area American Institute of Industrial Engineers, and is a registered professional engineer in California and Pennsylvania.

Off the job, Al enjoys gardening, hunting and competitive shooting; he is a past president of the Sandia Gun Club. Al and his wife Betty have two children -- a married daughter and a son who is a senior at West Point. They live in the NE Heights.

Deaths

George Neufeld, an electrician in Remote Areas Maintenance Division 3618, died suddenly Oct. 22. He was 53.

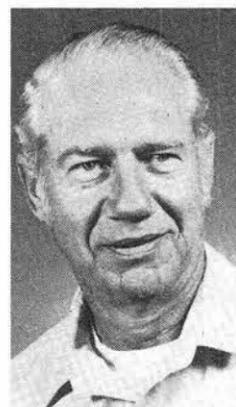
He had worked at the Labs since December 1951.

Survivors include his widow, a daughter and three sons.

Howard Plein of Reactor Containment Safety Studies Division 4422 died Oct. 22 in an automobile accident. He was 35.

He had worked at Sandia since January 1975.

He is survived by his widow.



Retiree Deaths

David Winner (61)	07/01/78
Harry U'Ren (64)	07/08/78
Glenn Anderson (76)	07/16/78
John Banker (59)	07/23/78
Robert Schwartz (66)	08/03/78
Harold Smith (74)	08/13/78
Julian Baca (74)	09/02/78
Raymond Goddard (66)	09/12/78
Warren Moore (84)	09/22/78
Gurdon Miller (68)	09/28/78

Events Calendar

Oct. 27, 28, Nov. 2-4 -- "Timespace," UNM Rodey Theater, 277-4402.
 Oct. 30, 31 -- "Dracula," Tiffany Playhouse, 800 Rio Grande NW, 8 p.m.
 Nov. 3-5, 10-12, 17-19 -- "Flea In Her Ear," Vortex Theater, 8 p.m.
 Nov. 3-5 -- Southwest Arts and Crafts Fair, Agricultural Exhibit Hall, State Fairgrounds.
 Nov. 3, 4 -- "Don Giovanni," Albuquerque Opera Theater, Popejoy, 8:15 p.m.
 Nov. 6 -- José Limon Dance Co., UNM Cultural Entertainment Series, Popejoy, 277-3121.

Authors and Speakers

D.C. Reda (5630), invited seminar, "Boundary-Layer Transition Research Utilizing Ballistics-Range Facilities," Rutgers University, Oct. 11, New Brunswick, NJ.

G.L. Cano (4423), R.W. Ostensen and M.F. Young (both 4425), "Visual In-Pile Fuel Disruption Experiments," International Conference on Nuclear Power Reactor Safety, Oct. 16-19, Brussels, Belgium.

T.W.H. Caffey (1584) "Maxium Induced Voltage Between Coaxial Coils," October 1978 IEEE Transactions on GEOSCIENCE ELECTRONICS.

B.W. Duggin, M.J. Forrestal and R.I. Butler (all 4233), "Impulse From an Electrically Exploded Etched Copper Mesh," Vol. 16, No. 8, AIAA JOURNAL.

M.J. Forrestal and M.J. Sagartz (both 4233), "Elastic-Plastic Response of 304 Stainless Steel Beams to Impulse Loads," Vol. 45, No. 3, JOURNAL OF APPLIED MECHANICS.

P.B. Higgins, F.H. Mathews and R.A. Benahm (all 1533), "A Non-Contacting Beta Backscatter Gage for Explosive Quantity Measurement," Bulletin 48, September 1978, THE SHOCK AND VIBRATION BULLETIN.

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LIVERMORE NEWS

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LIVERMORE LABORATORIES

OCTOBER 27, 1978



APPRENTICE GRADUATE — Now a laboratory maintenance specialist and journeyman painter, Ray Lopez (8257) recently completed SLL's apprenticeship program which consisted of three years of on-the-job training and related academic courses.

Retiring



Hal Faulkner (8272)



Armen Meyers (8413)

Sympathy

To Ramona Andersen (8214) on the death of her mother in Livermore, Sept. 22.

To George Mincks (8257) on the death of his father-in-law in Madison, FL, Oct. 8.

To Ken Foster (8256) on the death of his father in Taft, TN, Oct. 6.

To Carl Wackerly (8423) on the death of his daughter in Shelter Cove, CA, Oct. 14.



PLANES designed and built by Walt Ghio (8272) took the national model airplane championship recently in the Lord Wakefield category. Competition consisted of 18 rounds — six a day for three days — in which Walt tallied a perfect score.

Walt Ghio Flies Lord Wakefields

SLL draftsman Walt Ghio (8272) is back from recent competition in Bakersfield, Calif., where he successfully defended his national model airplane championship title earned two years ago in Minnesota. His win takes him to Yugoslavia next spring as a member of the U.S. team which will compete in world championships.

Walt ranks as the nation's best designer, builder and flyer of models in the "Lord Wakefield" category. Wakefield models, named after an Englishman who pursued the sport, can be described as super-refined gliders that are tuned to achieve a maximum time in the air. They are powered by rubber bands.

A small wood model his parents bought him 25 years ago started Walt on his way. "In the beginning, my brother and I were building kits but later got into gas powered models," recalls Walt. "I've been in contests since 1956 but didn't start flying Lord Wakefields until 1965."

Currently Walt has nine Wakefields which he is constantly upgrading. In addition, he has a new design under construction. "Only the proportions are different," he says. "I like the way my designs fly with the present length, so I usually keep the fuselage the same and change the wing plan. My latest plans are of sheeted balsa wood construction to avoid the problems I encountered when it rained at the world championships in Copenhagen last year. The balsa will still absorb moisture, as the tissue did, but won't loosen, and the warps will stay on the model.

"The rules state 294.5 square inches maximum for the wing and stabilizers, referred to as supporting surfaces," continues

Walt. "So, it's a matter of taking that number and designing what you think will work. First I take off about 50 square inches for the stabilizer area, plus a couple for safety reasons to make sure I'm not illegal, then lay out a wing in two configurations — one for very calm conditions and a shorter type to fly in the wind. Maximum rubber weight allowed is 40 grams."

Walt estimates building a model takes eight hours a day working steadily for at least a week, perhaps over a month working just evenings and weekends. But he believes that being a draftsman, which requires using his hands, is a real asset. In addition, his Sandia engineering friends are good sources for information — for instance, he is now using a new material to replace the Fiberglass cloth in his fuselage construction. Experimenting over a month, he developed a new bonding process and was able to replace the aluminum motor tube with a lighter component.

Competition is flown in rounds of one hour each, and the flight can be initiated at any time during that hour. A successful flight consists in keeping the model airborne for three minutes. "To achieve this," says Walt, "I try to launch in a thermal. If your model doesn't find a thermal, the usual flight lasts only two minutes or so. We're dealing with something where a second can make the difference between winning or losing."

Walt has good hopes for Yugoslavia. He says the North Koreans have been world champions the past two years and it would be great if the Americans can come through — especially one named Walt Ghio.

New Facility Treats Sludge

the metals or chemicals. Therefore, only sludges which contain minimal amounts of these products can be earmarked for use as animal feed supplements or crop fertilizers. An EPA program is addressing ways to control heavy metals and toxic chemical pollutants.)

Sludge handling and disposal costs, which average \$30-\$50 a ton, constitute about 40 percent of the total cost of wastewater treatment in a typical municipal sewage plant. Because it frequently cannot be used in the food chain, untreated sludge sells for about \$10-\$50 a ton.

"Killing pathogens in dried sludge with cesium and bagging the product for sale may cost as little as \$25 a ton," says Jack Sivinski, supervisor of Applied Biology and Isotope Utilization Division 4535. "This product could then be sold for up to \$100 a dry ton as a feed supplement for cattle and sheep, and for up to \$60 a dry ton as a crop fertilizer. This would cut sewage disposal costs significantly.

"Our ultimate goal," Sivinski says, "is a product which is not only inoffensive, non-toxic, and non-polluting, but useful in a hungry, energy-deficient world."

SIDSS will be used in three areas of investigation:

1) Irradiating dried raw sludge from the city of Las Cruces for use in the Sandia/NMSU animal feeding program, a five-year experiment in which feed supplement pellets made mostly of irradiated sludge are fed to range cattle.

2) Conducting irradiation experiments to determine the best way to maximize pathogen reduction while maintaining nutrient value of sludge.

3) Verifying shielding calculations and gaining operational experience on a pilot scale.

In the SIDSS, dried or composted sludge will be loaded into buckets and conveyed to an underground radiation zone to pass over and under the gamma source.

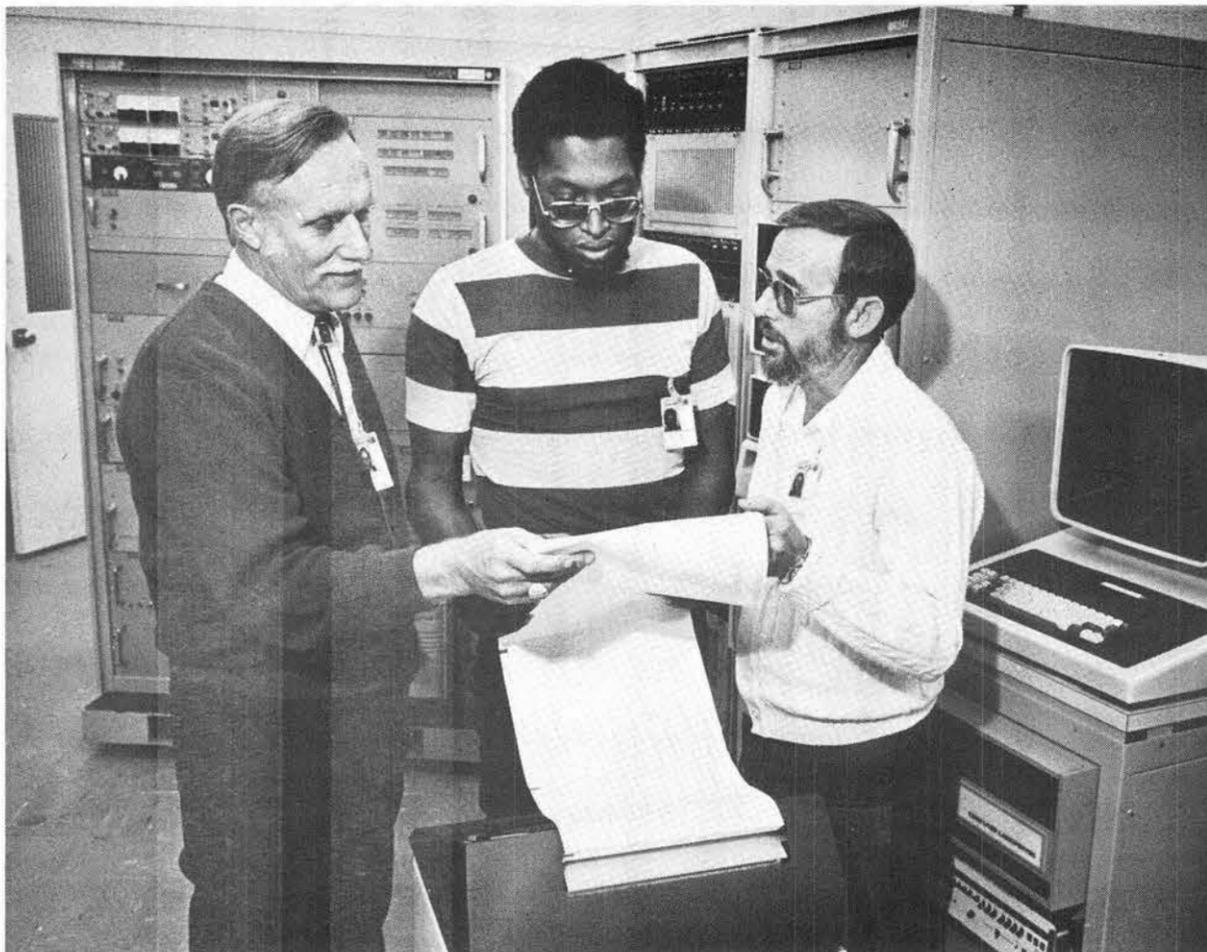
The source, 15 capsules each containing 65 kilocuries of cesium-137, has a useful lifetime of 30 to 60 years. Gamma rays from cesium-137 are not energetic enough to induce radioactivity in the sludge. Twenty buckets occupy the radiation zone at one time. Doses are varied by altering conveyor speed.

Interest in sludge management has increased for several reasons, Sivinski says. "First, ocean dumping of sludge, long a cheap, simple disposal scheme for coastal cities, is to be phased out by 1981. In fact, some ocean dumping permits are not being renewed.

"In addition, Public Law 92-500 now requires secondary wastewater treatment for all effluents discharged into navigable waters. Studies show that this will at least double the 1970 sludge output of the U.S. by 1985.

"Also," Sivinski says, "increased energy costs are making disposal schemes such as incineration impractical, and air pollution standards further limit the use of incineration."

Using sludge as landfill — a widespread practice — presents problems because of expensive transportation and land costs, unsatisfactory locations, and potential ground water contamination.



1400 DIRECTOR LUKE HEILMAN discusses new stand-alone test system with project engineer Frank Ross (right) and ESA Ron Taylor (center). Four of these systems (which acquire, store and analyze data from weapon tests) are being built by Systems Test Equipment Design Division 1426 for use by Stockpile Systems Test Division 1424 at Pantex.

The Directorates

1400: Part I: Quality Assurance

Assuring the quality and reliability of that part of the nation's nuclear stockpile built from Sandia Lab designs is an awesome responsibility. But in the simplest terms, that's one of the missions of Quality Assurance and Process/Fabrication Labs Directorate 1400.

"It boils down to this," Director Luke Heilman told us, "the best-designed stockpile in the world is essentially useless unless you're assured the weapons will work when you need them. Our job in 1400 is to detect defects occurring during design, production, stockpile — and to instigate corrections of those defects before they seriously degrade the stockpile."

This mission is met in many ways:

- They study evolving designs and test plans to pinpoint areas of possible difficulty.

- They evaluate and approve the more than 200 testers and gages needed for each weapon system to determine if components and assemblies meet specifications.

- Working with Sandia product engineers, they evaluate tool-made samples — products taken from pre-production runs using War Reserve processes, procedures and tooling.

- After major components and assemblies (including warheads and bombs) have been produced, inspected, tested and certified by the production contractor, they are submitted to DOE/ALO for government acceptance. DOE staffs and operates these inspection agencies, but 1400 assists by providing technical direction. Rates of sampling are high during early production to insure that significant problems in design, production or assembly are promptly detected.

Once weapons go into stockpile, 1400 takes over full responsibility for QA, continuously testing and evaluating Sandia-designed weapon material. Samples selected at random from newly produced weapons and samples returned from stockpile are tested to

determine if age, storage environments or field handling have degraded them in any way.

Some stockpile samples are completely disassembled and tested, component by component. Others are subjected to system tests at the Pantex Plant in the Stockpile Systems Test Lab staffed by 19 employees of 1400 who live in Amarillo. Most lab tests are made with automated equipment designed by 1400 for each weapon program — equipment which evaluates all weapon delivery options under controlled worst-case inputs (which might be supplied by centrifuges or other special equipment).

In cooperation with the military services (who provide delivery aircraft and complete missile systems), QA also participates in flight testing — tests to verify that systems would function in actual operating environments. The nuclear portion of the flight-test weapons is replaced by Sandia-designed, DOE produced instrumentation which measures component and system operation — instrumentation which duplicates the weight, size, center of gravity, moment of inertia and reaction of the nuclear portion to inputs from the rest of the weapon system.

The 1400 organization is involved in a variety of non-weapon projects, too. Luke Heilman listed several, including the nuclear power supply programs and the programs to produce logic and instrument modules for use in satellites designed to detect nuclear blasts.

Concerning his organization's approach to QA, Luke summarized: "Our mandate is to assure the DOE that weapons meet design and quality requirements — both expressed and implied. We're part of Sandia, but we *always* take the customer's viewpoint. The stakes are too high to approach the problem in any other way."

(Editor's Note: A second article dealing with the mission and function of 1400's Process/Fabrication Labs will appear in a future issue.)

Reduced 43 Percent

Dave Caskey Uses Simple Means to Cut Heating Costs

Using simple and inexpensive means, Dave Caskey (1115) has reduced his home heating bills by 43 percent. Total expenditure to achieve these savings was only \$350.

Dave concentrated on reducing heat losses from infiltration, windows and furnace efficiency.

"Detection of infiltration is largely a matter of being observant for unexplained air currents," Dave says. "I discovered a major loss in the furnace air return ducts. Three different ceiling vents feed return air to the downflow furnace located in the garage. The large, uninsulated ducts run through the unheated attic. When the furnace was not running, cold air poured out of all three vents. A simple cure was to fashion automatic dampers out of cardboard with masking tape hinges, installing them just above the ceiling vents. A strip of foam tape around the edges provides a reasonable seal. Cost? Zero. Benefit? Unknown, but noticeable in comfort sense."

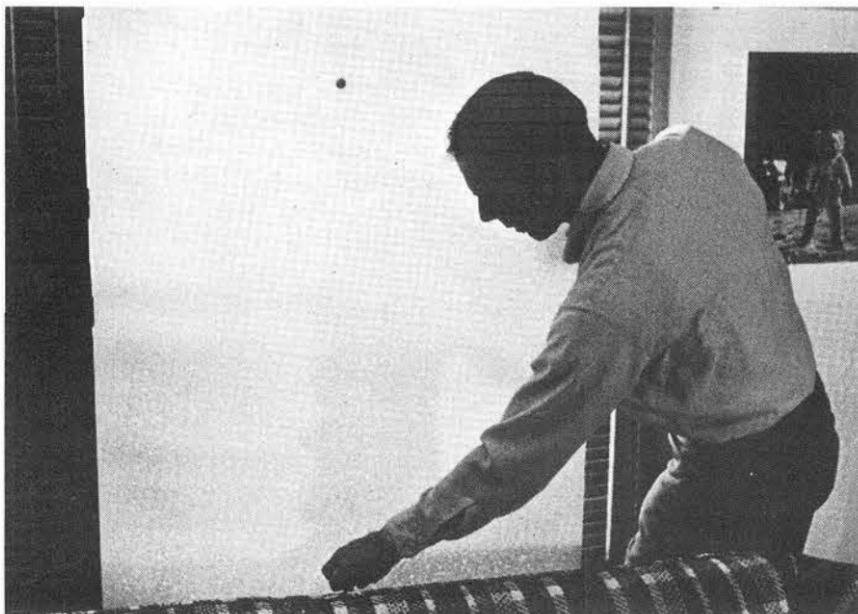
Dave also fashioned a locking rod from a coat hanger for his fireplace damper (which occasionally on windy days would blow open and stick that way), and closed and insulated vent fans in the bathrooms. He also checked electrical outlets on outside walls, taping and insulating the ones which seemed to permit cold air to leak in.

"The only real expense of this project occurred in dealing with window losses," Dave says. "In early 1976 we installed storm windows built by a local firm on five of our eight windows. Cost was \$228. The difference that winter was noticeable both in comfort level and gas usage. Last fall we bought three more storm windows — this time we got 'ready mades' rather than custom ones. They cost half as much and worked fine."

Installation of storm windows took care of most of the infiltration losses at the windows but the losses through conduction were still "horrendous." Dave decided to use a one-inch thick styrofoam panel cut to fit tightly in each window as a form of "night insulation."

"I bought scrap pieces of Insulbead from a local manufacturer," Dave says, "which was easy to cut and work with. I installed knobs (drawer pulls) on each panel for easy handling but, frankly, putting them in each night and taking them out in the morning was a pain. So we left them in place. Sure, it made the rooms dark but the drapes were usually closed in the winter anyway. We left the window in the kitchen (the only one with a view) open and also one side of the sliding glass doors to the patio. On really cold nights we fitted foam panels to these also. I figure \$28 worth of Insulbead accounted for one fourth of our 43 percent fuel savings. We now turn the furnace completely off during winter nights, and the temperature rarely drops below 60°."

Dave had read that most gas furnaces are oversized and inefficient, and that by



DAVE CASKEY (1115) fits a foam panel into a window. This and other measures reduced his gas bills by 43 percent.

decreasing cycling — reducing the number of times the furnace goes off and on — efficiency could be improved. He adjusted the flame in his furnace by turning the gas feed valve down until the flame was about half its former size. The furnace now burns twice as long to produce as much heat as before.

"Massive addition of insulation is not generally a cost effective way to save energy," Dave says, "and in my case it was out of the question. I use my attic for storage, and to add insulation I would have to rip out support boards and move a lot of junk. And insulation is expensive — it takes a long time to 'pay out' through fuel savings. I figure my present investment to save fuel will be recovered in about 3½ years."

Dave's house is singularly unsuited for a solar installation — not a single window admits direct winter sunlight, and the garage is located on the south side. Still, Dave has built a solar greenhouse, primarily for growing vegetables. "One of these days" he plans to duct warm air from the greenhouse into the living area.



The American Psychiatric Association has decided that the terms "neurosis" and "neurotic" have been so overused they no longer have any useful meaning. From their viewpoint, there are no longer any neurotics roaming the streets in America — just a bunch of people with "mental disorders." And you know what they say: a neurosis by any other name . . .



RADIO CONTROLLED model airplanes — more than 60 from five states — will be flying around Boca Negra Park near Volcano Cliffs tomorrow and Sunday as part of the 23rd annual "Fun Fly" sponsored by the Albuquerque Radio Control Club. Jim Baremore (2322) is contest director. The public is invited to watch free the aerobatics, precision flying, pylon races and other events. Activities start about 10 a.m. each day.

Schwoebel To Discuss Technical Aspects Of Double Eagle II Flight

Dick Schwoebel, Manager of Radiation & Surface Physics Research Department 5110, will discuss the technical aspects of Double Eagle II at a joint dinner meeting of ASME, IEEE and NMSPE on Monday, Nov. 6 at the Four Seasons Motor Inn.

Dick's presentation will deal with balloon design, instrumentation and communication equipment, and meteorological considerations affecting the flight profile and flight strategy.

Ben Abruzzo, the other speaker, will describe the flight and his personal experiences as part of the Double Eagle crew. Reservations must be made by noon, Friday, Nov. 3 through the telephone committee, Rod May (4-7669) or Bob Thomas (4-1457).

20 Years Ago

Molnar Assumes Post S.C. President, Oct. 1

J.P. Molnar, formerly vice president of the Bell Telephone Laboratories, became the fourth president of Sandia Corporation Oct. 1. He succeeds J.W. McRae who has been appointed vice president of the American Telephone and Telegraph Co.

* * *

90 Sandians in Nevada

Last week . . . the first full-scale underground nuclear device of Phase Two "Operation Hardtack," was tested at NTS . . . Information obtained from full-scale deep underground shots will be of interest in connection with "Project Plowshare" experiments now being projected in Alaska and near Carlsbad, N.M.

* * *

Rosenburg Honored by JC's

Walt Rosenburg, manager of Purchasing's Administrative and Coordinating Department, received a citation from the Albuquerque Junior Chamber of Commerce in recognition of distinguished service to the citizens of Albuquerque while serving as director of the Albuquerque Citizens Committee.

* * *

2500 Football Team Leads League

Teams 2500 and 2400, only two untied and unbeaten teams in the Flag Football League, met last weekend in a showdown battle for first place. The 2500 team registered an easy fifth victory 27-0. Ron Zottnick (2511) ran for two touchdowns and passed for another . . .

Survey

LAB NEWS: Mostly But Not Entirely Your Paper

That curious organ called the house organ is viewed by most employees as *their* newspaper. And, therefore, that newspaper should be the forum for their views, however controversial or contrary to company policy these views may be.

That's a consensus among respondents to a LAB NEWS readership survey recently completed. We who put out the paper find that consensus interesting, even engaging, but we're afraid our constituency misses the point: a company paper is a company paper. In most editorial matters, there is no conflict between the company and employee view, but when conflict does exist the company view prevails. After all, who pays the bills? We're reminded here of a certain rejoinder on freedom of the press: "It's something enjoyed by someone who happens to own a press."

Survey returns suggest that LAB NEWS is on the right track, that most of each issue is read or at least skimmed, and that employees generally take the paper home for family reading. Here are some reader comments on various aspects of LAB NEWS and our reply (when we could think of one).

On coverage, weapon vs non-weapon, and general reaction —

Read it cover to cover (of course, I also read the Heathkit catalog cover to cover).

Let's have more on weapon programs, like the B77 article.

Know you are a company paper but there must be some responsibility to get the other side out, for instance old age discrimination suits or the recent pension plan suits.

More articles on management news, salary package, reorganization whys, etc.

It's great (but it could be better).

Non-weapon projects have received an inappropriate emphasis.

Written as if Albuquerque is at the center of the solar system. Why not blend Albuquerque, Livermore and Tonopah?

We've made an effort to generate more articles in LAB NEWS relating to Sandia's main stream activity — the weapons programs. And we've been moderately successful. But we're still looking for story leads and sometimes feel we're up against a long-established tradition of "no publicity" in the weapons area.

Concerning law suits, it is not only inappropriate but could be illegal for LAB NEWS to comment on litigation involving Sandia.

Earlier in the history of LAB NEWS, Livermore news was simply incorporated into the paper like other news. A good argument can be made for this approach, but a good argument can also be made for the present arrangement.

On recognition —

Give more credit (at least mention their names) to more of the principal contributors to the technical projects.

Agreed. We make the effort, though our contacts on a story sometimes have differing notions on "principal contributors."

Extracurricular activities —

More sports news, especially highlights of weekly league games in basketball, softball, bowling, etc.

Agreed, but someone has to let us know.

On Authors & Speakers —

Replace Authors & Speakers with an expansion of coverage in the technical area.

Who reads all those titles and names anyway?

OK, just to show that we pay attention to surveys, we're changing the groundrules on A&S, and future entries will derive only from the initiative of the individual author or speaker. Up to now, LAB NEWS dug out the information appearing in this column.

Pretty girls —

Bring back Betty Jo Espinosa.

Maybe the pinups on the back page were MCP stuff, but they gave everybody something to talk about and I miss them. Every paper needs a reason to make a person grab it and look at it — and the pinup did that.

Some people object to them — these days, that's often enough to end the subject.

On retirees —

Find some way to get retirees to communicate more to LAB NEWS.

We'd like to get more news from our many retirees, but our efforts up to now haven't met with success. We've even tried a mailing to every retiree.

Vista New Mexico articles —

Badly researched; patronizingly written.

Cultural and historical articles are very good.

In appreciation of history, it makes a difference whose ox is gored.

Physical fitness —

You've stressed more active aspects of fitness — perhaps the medical and nutritional aspects could get more attention.

Very tired of continuous flow of articles on running and biking.

Add a health section — talk about smoking, exercise, tension, etc.

Physical fitness is here to stay, and we'll continue to encourage employees to become fit. We like the idea of a broader view of the subject, to include more medical and nutritional information.

Miscellany —

I miss Bruce's wit.

He's exercising it at Sandia Livermore now.

Drop the editor — prints nothing that goes against his grain or that of management.

When you get to be editor you can change things.

I think an honest effort has been made to expose all groups.

Wonder how he means that . . .



JEFF GAMON (right) buyer in Purchasing Division 3725, talks with two executives of Ideal Industrial Electronics Supply at the recent Minority Business Opportunity Fair held at the Albuquerque Convention Center. Jay Hughes, manager of Small and Minority Business Relations Division 3731, was co-chairman of the fair, which was part of a one-day conference of minority business owners. Objective was to share knowledge of business management and to talk to buyers like Jeff Gamon who purchase products and services from New Mexico suppliers.

Milepost Firing of High-Velocity Gas Gun

It was an auspicious day (Friday, Oct. 13) and an auspicious moment — the 1500th firing of Sandia's High Velocity Compressed Gas Gun. The projectile was in place, the target in position and the pressure was mounting. At 1000 psi, G.T. Holman (5131 ESA in charge of the gun) turned off the compressor and started the countdown.

When the "Fire" button was pushed there was a barely audible swoosh as the projectile hurtled 82.5 feet along the barrel of the gun. It struck the target (in this case a disk of aluminum) with a sharp thwack. It was a moment that had taken 16½ years to arrive. Now the 1500th firing was history. What, we wondered, had been accomplished with all those experiments? What had been learned?

We put those questions to Bob Graham of Explosives Physics Division 5131 who had invited us to the milestone event.

"Since the first shot was fired on Feb. 19, 1962," Bob told us, "over 50 investigators have used the gun to study the effects of shock loading. In both weapons and energy work, you need to know material strength, compressibility, what kinds of shock-induced phase transitions will occur."

This gun along with other guns in Departments 5130 and 5530 are being used for a wide range of materials studies. These facilities have given Sandia a leading role in the investigation of shock wave phenomena.

In the larger context, shock-wave physics has provided the critical data needed to study the interior of the earth and planets and other locations where high pressures exist naturally. Bob points out that industrial diamonds and other hard materials are now made commercially with shock loading, that steels are made harder and parts routinely shaped with explosive loading, that the first sandwich coins were made from metals joined by explosive loading, and that underground explosions are used to rubbleize oil shale for in situ processing.

At Sandia, some specific technical



FAST GUN — And much used. In fact, shot number 1500 was fired off this month in Sandia's High Velocity Helium/Air Gun, now in its 16th year. G.T. Holman (5131) holds target and projectile. Compressed gas gun is used in shock-wave research.

achievements have come out of shock-wave experiments on The High Velocity Compressed Gas gun. One is the Sandia quartz gauge, used in the underground test program.

"We've developed other gauges, too," Bob says, "the sapphire gauge, the lithium niobate gauge, the acceleration gauge. We've investigated shock-induced demagnetization, critical in the design of shock-actuated ferromagnetic power supplies. We've studied piezoelectricity (pressure electricity), dielectric constants, electrical conduction and dielectric breakdown. Our current experiments are designed to give us a better understanding of dielectric switches, the shock initiation of high

explosives as well as shock depoling of ferro-electrics."

As a final comment, Bob points out that the effects of the shock process (when the projectile hits the target) are usually completed in less than a millionth of a second. "It takes precision and control and some sophisticated optical and electronic probes to get the kind of data we need," he told us. "The High Velocity Gas gun facility (which was designed by Sig Thunborg, now 4722, and George Ingram, now 1254) gave Sandia a capability in shock-wave physics which is still unsurpassed for precision and control."

Take Note

The Albuquerque Opera Guild is sponsoring a tour of four solar homes tomorrow and Sunday, Oct. 28 and 29, from 12 noon to 6 p.m. Cost is \$1. The new homes, according to the release, "... have the most advanced energy conservation features of homes on the market today, they have architecturally integrated solar collectors, and solar systems designed with off-peak electric energy storage." If you want to tour, go out to 8316 Cherry Hills Drive NE, which is east off Wyoming on Harper Road, just beyond Albuquerque Academy. Guided tours are provided at each of the four houses.

* * *

Dick Schwoebel (5110) and Ruth Whan (5820) are hosts to a Conference on Analytical Methods which is set for next month, Nov. 8 and 9. Participants include scientists from the national labs and the integrated contractors of DOE. Objective of the conference is to promote information exchange among the analytical groups and to identify areas worthy of investigation. The meetings will be held in Bldg. 632.

* * *

"Oh, my aching back" is a phrase that may disappear from the language as Sandia's Medical organization continues to offer back exercise classes — a new class starts Nov. 7 and meets Tuesdays and Thursdays from 5 to 6:15 at the Coronado Club. To enroll, call Wanda Cupp (3320), 4-7169.

A FEATURE of the new entry way to Bldg. 800 is this wheelchair ramp. Project includes new steps, walkways and planters, was completed under direction of Building & Facilities Division 3642.



Bonding Process Enhances Drill Bit Performance

An improved method of bonding man-made diamond cutting elements to drill bits has been developed at Sandia Labs. Special Products Division 2325 (bit design), Process Metallurgy Division 5833 (bonding technology) and Drilling Technology Division 4735 (overall project responsibility) joined forces on the project. A successful laboratory test using General Electric's Stratapax cutters has been completed, and field tests now are planned.

The new diffusion bonding technique involves attaching the Stratapax diamond cutting elements to a tungsten carbide stud or directly to a bit body. The resulting bonds have shear strengths of between 60,000 and 80,000 psi — strong enough even for hard rock drilling at high temperatures.

An ultimate goal of the project is to reduce costs of the bits by bonding Stratapax directly to the bit body instead of pressing Stratapax stud assemblies into holes drilled into the bits.

In the bonding process, the Stratapax and the studs are coated with nickel, then locked together and placed in a thin-walled steel can filled with a pressure transfer medium (graphite).

The can is evacuated and sealed, placed in an autoclave, and subjected to 30,000 psi at 650°C for four hours. Under these conditions, the metallization layers flow and the surface

impurities diffuse into the nickel. This creates a uniform high-quality weld.

A laboratory test using the new bit was conducted last spring at Terra Tek Drilling Research Laboratory in Salt Lake City, Utah. The test bit, which contains 12 Stratapax cutters, "performed very well in an overstressed condition with bit weights up to 30,000 pounds," says Charles Huff (4735), project engineer. The bit drilled through Carthage marble for 25 feet at rates up to 100 feet an hour at bit weights up to 8000 pounds. There was no perceptible wear.

The bit was then tested in much harder Sierra white granite at rates averaging 60 feet an hour for about 70 feet. "In drilling granite the wear rate was significant, as expected," Charles says, "but these drilling rates were about 10 times those possible with conventional diamond bits." Bit weights were in excess of 18,000 pounds. Cutter wear was greatest on the outside of the bit, gradually decreasing toward the center. Field tests in igneous formations and shale are planned for later this year.

A 6½" all-Stratapax bit, a hybrid roller-cone/Stratapax bit and a Stratapax core bit will be tested in the laboratory as soon as fabrication is complete. Field tests for the most promising designs will follow. "If these tests are successful," says Sam Varnado, supervisor of 4735, "increased emphasis will



CHARLES HUFF of Drilling Technology Division 4735 and improved drill bit.

be given to transferring this technology to private industry."

Work on this project is funded by DOE's Division of Fossil Fuel Extraction.

Retiring



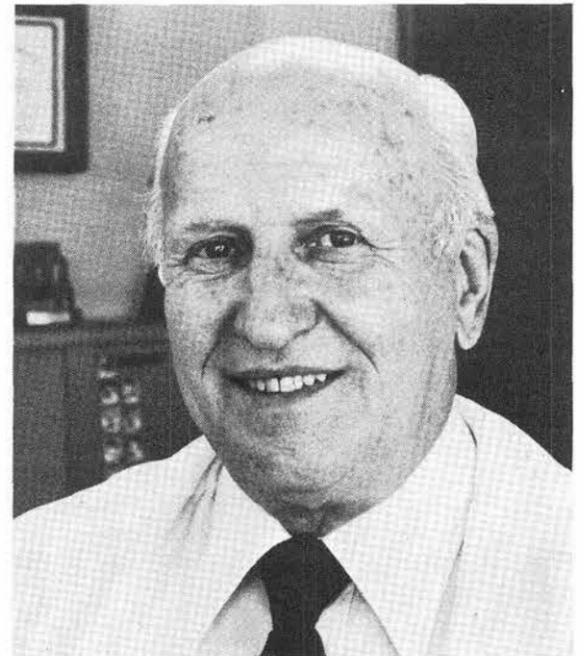
Dick Prokash (1211)



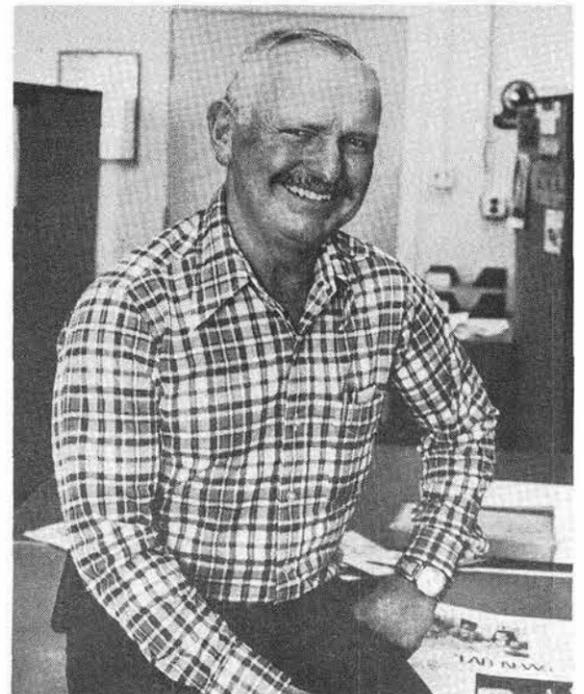
Gene Lucero (9563)



Delmar Dufty (1481)



Larry Neibel (3170)



Walter Haskell (1712)

Fun & Games

Running — Henry Dodd (4716) was the leading Sandian in the recent Tour of Albuquerque Marathon, completing the 26-miler in a creditable 2:49. Other Sandians in the Marathon include Jim Harrison (4311), Irv Hall (1223), Larry Johnson (4325), Terry Bisbee (2635), Al Spencer (3643), and Gerry Quinlan (2647). For Quinlan, it was his first marathon.

The Big Apple last weekend felt the fleet footsteps of Sandia's world-class runner, Pete Richards (5132) (i.e. he's run all over the world). Pete and 11,164 others did the New York City Marathon, Pete in a fast 2:57.

* * *

Raquetball — The dawn patrol raquetball program which proved so successful last fall has again been established. Hours of play are from 6 to 8 a.m. A court may be reserved for \$2 per hour by calling Bob Giersberg at the C-Club on 4-8486.

* * *

The decathlon — C-Club rec manager Bob Giersberg would like to organize a sports decathlon for Sandians which would offer entrants a selection of 10 athletic events from a much larger listing. For example, the events could include running, cycling, bowling, rifle & pistol shooting, tennis, raquetball, squash, swimming, handball, cross-country skiing, table tennis and any other individual activities the decathlon committee can come up with and figure how to score. But Bob first needs a decathlon committee, ideally made up of persons who have some expertise or at least knowledge about one or more events. Call him on 4-8486 if you're interested.

* * *

Biking — There's a "Bicycle Fiesta" set for Nov. 4 & 5 down at Socorro which includes road races, sprints, a "slow race," criteriums, a bike cross, a coasting race and, finally, a "bike dexterity contest." For more info, call Jim McCarthy at NM Tech on 835-5131.

* * *

Skiing — The C-Club Ski Club is holding its Dry Land Ski School tomorrow, Oct. 28, at the C-Club from 1 to 4 p.m. Tom Long from the Sandia Peak Ski School will preside, teaching novices all about ski equipment, putting it on, taking it off, falling down, getting up, and how to be a Truly Beautiful Person on the slopes.

A Get-In-Shape-For-Skiing exercise routine started last night (the 26th) at the Club, but there's 11 more sessions to go and you can make them Tuesday and Thursday evenings at 7. Exercise programs of about 45 minutes are being conducted by Janet Colvet. It's free to CSC members, otherwise five bucks.

* * *

Tennis — For employees' wives, a round robin tennis program is set for Wednesday mornings at 9 a.m. at the C-Club courts. Show up at the courts and ask for Anita if you're interested, or call 4-8486.



DALE HASKINS (4714) built these solar collector structures on top of his garage some 30 ft. from his house. Solar heated hot water circulates into a thousand gallon heat storage tank in the garage and then into a baseboard radiation heating system in the house. The solar system provides 85 percent of his space heating needs and 100 percent of the hot water.

Overlooking Tijeras Village

Dale Haskins Builds Super Solar System

(Ed. Note — This is another in a series of articles about home solar systems built by Sandians. If you have an operating system, call LAB NEWS, 4-1053.)

Dale Haskins (4714) built a sophisticated solar heating and hot water system for his three-bedroom home (1100 sq. ft.) which sits atop a hill overlooking the village of Tijeras. The system provides about 85 percent of his space heating needs and 100 percent of the hot water.

Researching, designing and construction of the system took about nine months of evening and weekend time plus a couple of weeks of vacation.

An accomplished builder (Dale built the house on the hill and two large garage/workshops on the property), he had to learn some new skills to construct the solar system.

The system consists of two rows of flat plate collectors (360 sq. ft. total) mounted in two triangular structures about six feet high on top of an adjacent flat roofed garage some 30 feet from the house. The collectors are 2'x6' copper sheets with a selective surface (more about this later). A grid of copper tubing is soldered to the front side of the collector plates. A solar-heated water-glycol solution circulates through the collector grid tubing and into a 1000-gallon Fiberglass heat storage tank inside the garage. The tank is about half buried in sand and covered on top by a minimum of one-foot thick loose fill insulation. Two heat exchangers operate inside the tank — one for the collection loop, the second for the baseboard hot water heating system which is piped underground into the house. Each circulation loop is driven by 1/12 hp electric pumps.

The hot water for the house heating system either goes directly into the baseboard radiation system or, when its temperature is less than 140°F, into a water-to-air fin coil heat exchanger located in the blower plenum of the air circulation system. Switching from the high temperature baseboard heating

system to the low temperature air system permits full use of the available heat stored in the water storage tank. Water temperature inside the tank changes less than two degrees overnight.

Differential thermostats automatically control the circulation systems.

The system has been operating for two winters now. Previously, Dale's oil-fire furnace burned almost 600 gallons of fuel oil each season. The solar system has reduced the amount to 100 gallons.

The selective surface on the flat copper collector plates is the result of immersing the sheets in a hot (150°F) bath of sodium hydroxide and sodium chlorite for about 10 minutes. This gives a coating on the copper which has high absorptivity to solar radiation and relatively low emissivity to infra-red; thus it performs as a heat trap.

Dale researched the coating through Sandia's Tech Library. To do the coating job, "I had to learn about chemistry," Dale says, "and change the soldering flux used on the copper tubing. The coating didn't adhere to a petroleum-based flux. I learned about soldering too. After patching a lot of leaks — and I mean a lot of leaks — the system is finally locked up tight. No leaks now for more than a year."

Dale fabricated all of the collector plates and grids on a jig to keep them uniform. All connecting joints are soldered.

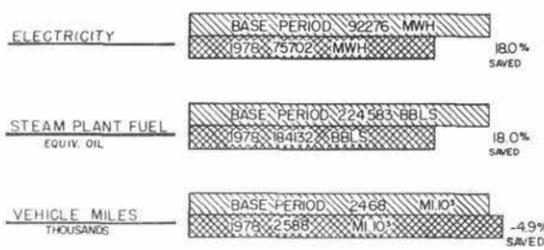
Now that the system is functioning without problems, Dale is entering his third winter with confidence.

"As a matter of fact," Dale says, "the system produces a lot of excess heat — particularly in summer — which is vented out of the collector structures. I'm wondering about using this heat to generate power. I keep watching the literature to see what develops."

Dale is in a good spot for this. After 23 years designing electrical systems for weapons, he transferred last year to Solar Technical Liaison Division 4714 and now works to transfer Sandia's solar technology to industry.

ENERGY SAVINGS

COMPARED WITH USAGE IN BASE PERIOD—JULY 1972 THRU JUNE 1973
CURRENT REPORTING PERIOD ENDING AUG '78



MILEPOSTS
LAB NEWS
OCTOBER 1978



Dave Dannenberg - 8413 10



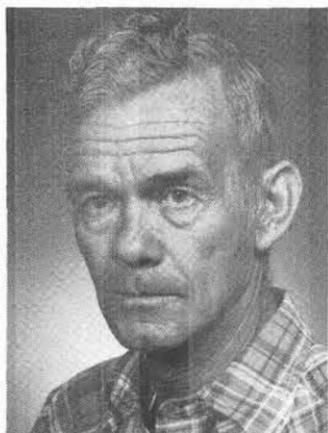
Polly Horne - 3254

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Marge Weitzel - 1130

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Andrew Kersey - 3618 20



Patricia Thatcher - 3410 15



George Merren - 1222 20



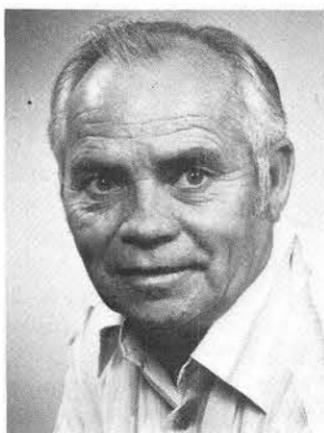
Hiram McKinney - 3613 30



Lewis Clauson - 8465 20



Donald Fulton - 1531 20



Paul Hamilton - 1482 30



Alice Vancil - 3253 20

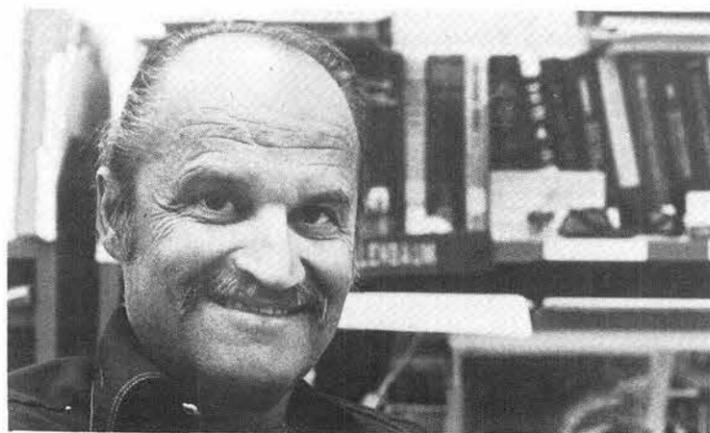


David Begeal - 2353 15



Dave Clenney - 3715

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Ralph Schellenbaum - 1757

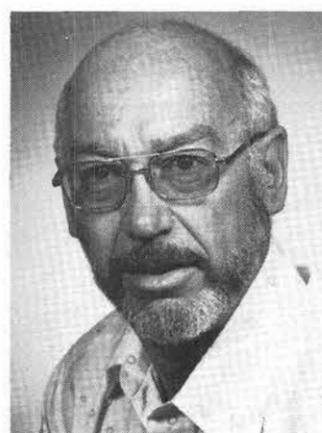
25



Paul Dominguez - 8161 20



Joseph Crompton - 1711 25



Gerald Villane - 4325 20

Financial Planning, Loan Limits & Insured Share Certificates

The Credit Union is offering a free evening seminar entitled "Financial Planning" on Nov. 1, from 7 to 9 p.m., in Theater Bldg. 815 (outside the Tech Area). The meeting is open to all Credit Union members.

How to coordinate income, assets, investments and savings plans with insurance, retirement and Social Security benefits is the subject of the seminar. It will be conducted by Walter Johnston from the staff of UNM's Continuing Education Division. Mr. Johnston has an extensive background in management, real estate, investments and insurance.

Attendance is limited to 250 persons, and admittance is restricted to those holding tickets, available at the Credit Union on a first-come basis. If the response is great enough additional seminars will be scheduled.

* * *

The Board of Directors has set a limit of \$10,000 on all first and second mortgage loans and FHA Title I home improvement loans, effective Oct. 20. Applications received prior to that date are not subject to these limitations. This restriction is necessitated by the shortage of loanable funds resulting from the heavy demand for these types of loans over the past several months, combined with a reduced inflow of savings. The Board feels every effort must be made to insure the availability of funds for other kinds of consumer loans.

* * *

Insured Share Certificates are available to members of the Credit Union for terms of one to six years with daily compounded annual yields ranging from 6.98% to 8.06%. Contact the Credit Union for details.



For most of us, static electricity is an irritant or at most a minor hazard. It makes clothes cling together in the dryer and, on very dry days, it turns a departure from a carpeted room into a shocking experience. But to computers, static electricity is an outright menace. Employees in computer facilities build up enough static charge by just walking around to alter bills and erase memory when they touch the computer. Word processing consoles and grocery registers are also vulnerable. The problem has spawned a new industry of static fighters. The best solution so far seems to be to encourage employees to keep their feet on the ground — by standing on carbon-loaded plastic mats that drain away static charges before they do bodily harm to the computer.

To Mr. and Mrs. Thomas Sullivan (1253), a daughter, Oct. 16.

Sympathy

To Barry Hansen (4338) on the death of his father in Seattle in October.

JUNK • GOODIES • TRASH • ANTIQUES • KLUNKERS • CREAM PUFFS • HOUSES • HOVELS • LOST • FOUND • WANTED • & THINGS

CLASSIFIED ADVERTISING

Deadline: Friday noon prior to week of publication unless changed by holiday. Mail to: Div. 3162 (814/6).

RULES

1. Limit 20 words.
2. One ad per issue per category.
3. Submit in writing. No phone-ins.
4. Use home telephone numbers.
5. For active and retired Sandians and ERDA employees.
6. No commercial ads, please.
7. Include name and organization.
8. Housing listed here for rent or sale is available for occupancy without regard to race, creed, color, or national origin.

MISCELLANEOUS

SEARS 14" chain saw, spare chain & instruction book, \$60. Mason, 299-2836.

FIREPLACE SCREEN, fits opening 25 1/2"x48 1/2", polished brass, \$35. Reynolds, 299-5757.

ANTIQUA DESK, \$95; rocker, \$45; ball & claw oak table, \$90; several rugs, wall hangings, art prints, hand-carved boxes. Wood, 299-4078, 11205 Prospect NE.

ELEC. RANGE, \$48; Craftsman lawn mower, 20", \$39. Johnson, 255-0262.

BEDROOM SET: Queen size bed, desk w/writing drop door, dresser w/mirror, all oak, country style. Marchi, 299-3653.

FIREPLACE/HEATER combination, free standing type, manufactured by Martin Co., never used, still in box, folding glass doors. Wright, 281-5828.

DINING ROOM SET: Drexel, contemporary, fruitwood, table 36x54, extends to 90, lighted china cabinet, 48x21x69, 6 chairs, \$550. Kreff, 881-3486.

15" PLYMOUTH wheels; 14" Chevrolet wheels, \$5 ea. Prevender, 299-5253.

FUEL MIZER, recovers heat from furnace flue, gas type w/blower, \$100. Sedlack, 266-6819.

5 ea. 7.50x17" WHEELS & tires, 8-lug hole pattern, make offer. Hymer, 298-2232.

CHILD'S PHONOGRAPH, Sears, 4-sp., \$9. Robertson, 299-7561.

RCA COLOR TV, 25" console, recent overhaul, \$50. Esch, 292-0754.

2-PC. SECTIONAL COUCH, blue, 11' long, Flexsteel, will deliver, \$95. Rarrick, 296-2340.

PANASONIC AM/FM radio cassette recorder, sleep, pause, tone, auto stop, 5" speaker, \$57. Gallegos, 298-3589.

HOUSEHOLD GOODS: thermal curtains for patio door & window, bedspread, recliner, Moulton, 293-0373 after 5.

DROP-LEAF dinette table w/4 chairs, \$40. Fasano, 298-2954.

BROWNIE UNIFORM: size 8, jumper, slacks, 2 blouses, tie & belt, \$15; boys white Levi jeans, size 14 slim, \$6; Aristocrat 17' travel trailer, \$3300. Shenk, 296-6015.

WHITE PORCELAIN cast iron wall hung bathroom sink w/attaching bracket, \$5. Peterson, 256-7514.

FOUR 5-hole Ford wheels, 15", best offer. Pitts, 268-4718.

DACHSHUND PUPPIES, AKC reg., \$80 female, \$100 male; 50,000 BTU gas/propane Coleman space heater, \$75. Schaefer, 281-3271.

2 ROOM SIZE RUGS: 1 green short shag, 1 gold sculptured, \$30 ea.; 1 area rug, white shag, bound, \$40. Jackson, 294-6644 after 5.

PHILCO refrigerator, opens either side, not self-defrosting, \$50. Owens, 298-6951.

BICYCLE CARRIER for car, bumper mounted, carries 2 bikes, \$10. Drake, 299-1209.

ANTIQUA leather top folding game/dining table; antique refectory dining table, mahogany. Hale, 821-8850.

DANCING COSTUMES: 6 girls sizes 10-12, several styles, \$3 ea. Miller, 268-5992.

AQUARIUM, 10-gal. complete set up, \$10; dbl. cabinet, avocado w/white formica top, \$50; metal china cabinet, brown, \$50. Damrau, 881-4576.

MEN'S SKI BOOTS, Trappeur, size 9, \$15; basketball hoop, backboard & roof mount, \$20; trailer hitch, frame-mounted, \$15. Riggins, 299-7778.

MAN'S gold LED watch, \$20. Wilcoxon, 821-1621.

SINGER sewing machine, professional buttonhole attach., extra design cams, cabinet, \$100. Simons, 821-9343.

GE trash compacter w/extra bags & spray cans, \$115. Guttmann, 243-6393.

JUNIOR SKI CLOTHING: 2 parkas, warm-ups, sweater, stretch pants, sizes 10 & medium; pair Rosignal Jr. 160cm skis. Hanna, 299-1126 after 5.

TOOLMAKERS TOOLS, micrometers, indicators, telescoping gages, etc. Cyrus, 898-4038.

MAMIYA C-220 twin lens reflex, 135mm lens f4.5. Bressan, 268-5367 or 294-7226 after 5.

TIRE CHAINS: brand new, in assorted sizes, both car & lt. truck, \$12 set. Reed, 299-7425.

LIVING ROOM SET, \$350; kitchen table & 6 chairs, \$40. Barnard, 831-4114 after 6.

ETAGERE, 5-shelf, unassembled, \$7; 4 tray tables, \$6; 2 Cosco folding chairs, \$8 ea.; new 3 1/2-qt. Crockpot, \$9; swag light. Young, 292-1266.

EXERCYCLE, Sears best, cost \$100 new, sell for \$25 or trade for chest of drawers. Kidd, 299-0035.

DUAL 1215S turntable, \$30; double bed, mattress, box spring. Hommert, 883-3682.

COLOR TV, Packard Bell 21" console, approx. '68 model, Sam's Photofact included, \$45. Watkins, 266-1844.

SET KONI adjustable shocks, for '70-79 Firebird & Camaro, \$80/4. Webster, 298-8102.

30" HARDWICK GAS RANGE, dbl. oven plus broiler, top oven has rotisserie, coppertone, clock, timed oven option. Linnerooth, 299-6154.

LUGGAGE CARRIER, lg. size, 4' by 6' by 14" high, \$15. Newton, 299-1283.

WATER SOFTNER, Sears best, \$150; optical rangefinder, 16-200 yds., list \$50, sell \$25; 20" spyder boys' bicycle, Sears, \$25. Stevens, 299-6086.

NIKON LENS, 35mm f/2, \$165 firm. Passman, 821-4999.

1" GALVANIZED ROOFING NAILS, 25 lbs., \$10; twin bed, complete, 3 drapery rods; 30,000 BTU space heater, \$20. Aragon, 294-0225.

UNIVOX STAGE AMP, 4 10" speakers, 80 watts RMS, \$350 or best offer. Palmer, 299-5082.

TWO 36" kitchen wall cabinets, \$25/ea.; Sears mens jeans, 31-33, never worn, \$5 ea. Watterberg, 294-6759.

FOX TERRIER puppies, 10 wks. old, all puppy shots; male Welsh terrier, 18 mos. old, reg. championship stock, \$175 up. O'Neal, 298-2859.

SET-BACK thermostat, Heathkit, timed lowering of house temp. at night, \$35. Erickson, 298-4416.

45-PIECE Blue Willow china set made in USA, \$45; extra Blue Willow pieces. Gregory, 268-2022 after 5.

DRUM SET: 5 pcs plus Zeligian cymbals (24" & 18") and two 14" hi-hats, \$375. Babb, 898-8591.

TRANSPORTATION

'76 CHEV. MONZA 2+2 hatchback, 4-sp., AM, FM, 8-track, Michelin radials, lifetime shocks, 47,000 miles. Phelps, 294-5517.

TWO 26" Sears bikes, \$20 ea. or \$30 for both. Wilcoxon, 821-1621.

'70 FORD Galaxie, 2-dr., AC, PB, PS, AT, \$695. Solberg, 298-9248.

'78 ZEPHYR Z-7, 6-cyl., AT, 4200 miles, \$5000. Harris, 299-4559.

'65 PLYMOUTH Sports Fury, \$750. Barth, 345-0172.

'66 MERCURY 4-dr., std. trans., recent engine overhaul. Riley, 869-2119.

BICYCLE, ladies 3-sp., English, Hercules, fenders, rear baskets, kickstand, sidepull brakes, chainguard, \$55. Joseph, 299-6989.

'72 PINTO stn. wgn., AC, AT, 4 new tires, AM radio, 70,000 miles. Elliott, 294-2252.

'73 VW CAMPER, full pop-top, sleeps 4, elec. refrig., AC, AM/FM radio, sink, water supply, leather interior, new engine & brakes, window screens. Wilson, 344-5373.

'77 HONDA CVCC, 5-dr. wagon, front-wheel drive, 31.6 mpg, reg. gas. Dale, 344-6445.

'73 PONTIAC Catalina 4-dr. HT, electronic ignition, PS, PB, AT, 44,000 miles, new tires, \$1850. Morrison, 877-7425.

'71 FIAT SPYDER conv., 850cc, \$950. Rarrick, 296-2340.

'70 CHEVROLET Biscayne, 4-dr. sedan, manual trans., low mileage, \$600. Treadwell, 296-4626.

'67 VOLKSWAGEN Bug, needs paint, \$700. Kepler, 298-5652.

'77 VW Rabbit, 2dr., low mileage, AM/FM/cassette/8-track, \$4800 firm. Harvey, 265-3055.

GITANE boy's 10-sp., 24" wheels, completely retuned & readjusted, \$65. Stokes, 898-1237.

'75 TOYOTA Land Cruiser, low mileage, rebuilt engine, AC, AM-FM, \$4300. Kovacic, 256-0062.

'77 TOYOTA Celica liftback, 5-sp., low mileage, AC, AM/FM stereo & 8-track, radials, Electro Sensor system, \$4920. Roberts, 256-1592 after 5.

'70 CHEV. Impala V8, 350, AT, PS, AC. Stoeber, 296-3717.

'68 IH TRAVELALL; '76 RM100, never raced. Harper, 298-3344.

'78 TOYOTA Celica GT liftback, PB, AC, AM/FM stereo, instruments, Polyglycoat, extended warranty on drive train, 10,000 miles, \$6000. Binkley, 869-9195.

'74 BUICK Apollo, 4-dr. white, blue interior, 6-cyl., AT, PS, 40,000 miles, book, \$2500, asking \$2150. Morosin, 298-0994.

'76 VEGA wagon w/steel sleeved engine, AT, luggage rack, radio. McGuinness, 281-3860.

'76 CR 125 HONDA, performance shocks, \$550; Bell Star 7%, \$45. Webster, 298-8102.

'72 VOLKSWAGEN, 4-sp., 1700cc, fuel injected, tape deck, \$1250. Sparks, 898-1252.

'74 BMW R90/6 Windjammer II with lowers, craven bags and box, other extras. Warren, 294-5250.

WANTED

DONATE YOUR usable but unwanted handtools to Dennis Chavez School — hammers, screwdrivers, pliers, etc. Wright, 865-7843 or Zamora, 865-6280.

'67 MUSTANG deluxe plastic seat backs (left & right side). Wright, 281-5828.

REAREND for '66 Chevy II, prefer 4.11 Positraction. Prevender, 299-5253.

SAMSONITE "Silhouette" 2 or 3-suit, older model, prefer brown, but any color will do. Harris, 299-6664.

BUY OR BORROW service manual for '75 Chev. Merritt, 299-1482.

NON-WORKING MINI BIKE w/Briggs & Stratton engine or horizontal shaft lawnmower-type engine for TVI class. Rowley, 299-8419.

TWIN SIZE MATTRESS & box springs. Peterson, 256-7514.

BABYSITTER for 6 & 2 yr. old, sit 1 day/week in N. Valley home, patience & love required. Schroeder, 344-1011.

NEED to borrow color bar/dot generator, will leave deposit; need fertile soil, will load & haul. Barnard, 831-4114.

DODGE Dart or Plymouth Valiant, '73 or '74 in very good condition. Erickson, 298-4416.

FOR RENT

DUPLEX, 731 Jefferson NE, big 2-bdrms., 1 bath, washer hookup, single garage, \$250 plus utilities, available Nov. 1. Reynolds, 299-5757.

FURNISHED HOUSE, 2-bdr., 1 bath, \$300/mo. Clement, 881-0525 or 881-7040.

NEW HOME, Heritage Hills, 3-bdr., 1 1/2 bath, dbl. garage, all major appliances, carpets, drapes, landscaping, lease \$425/mo. Reda, 821-3817.

3-BDR., 1 1/2 bath, carpet, stove, AC, central heat, 3 miles from Wyoming Gate. Flores, 293-7993 or 293-8533.

RUSTIC MOUNTAIN CABIN, 1-bdr., fp, snow covered road in winter, view, 13 miles, \$150/mo. Souder, 281-3121.

1-BDR. HOUSE, unfurnished, southwest valley, east of Isleta Blvd. Zamora, 865-6280.

TAOS SKI VALLEY CHALET, luxurious, 3-bdr., 1 1/2 baths, sleeps 8+; fully equipped kitchen, ski to lifts; reserve early. Marion, 294-8256.

COUNTRY LIVING in Los Chavez, 3-bdr., LR, den, 2 baths, range, refrig., corrals, 35 mins. from Base. Reynolds, 299-7367.

ONE BDR. unfurnished apt., carpet, stove, refrig., no pets, 544 Charleston SE, \$150 plus utilities or \$180, new. Montoya, 255-8437.

LOST AND FOUND

LOST — Blue & white athletic tennis shoes, dk. blue windbreaker, man's lt. cream "Druce" sweater, olive drab New Testament, HP #21 calculator, silver Cross fountain pen, tortoise shell rim Rx glasses, govt. key ring w/2 keys, five keys on 2" flat 3-strand brown leather ring, women's plastic-rim Rx glasses in red cloth case, 4 or 5 keys on steel ring, 10 keys on nickel-plated key ring.

FOUND — Sargent lock. LOST AND FOUND, Bldg. 832, 264-1657.

REAL ESTATE

GLENWOOD HILLS, improved home site, 4020 Hidden Valley Ct., NE, city view. Key, 298-7988.

HOUSE, 2300 sq. ft., 3-bdr., 2 1/2 baths, formal DR, lg. LR, den w/fp, 2-car garage. \$74,500. Denney, 268-0004.

ONE-YEAR-OLD 4-bdr., 3-bath, upgraded custom home w/den & separate guest area, NE heights, \$70's. Chavez, 299-5875.

'75 BROOKWOOD, 14x80, 3-bdr., 1 1/2 bath, lg. master, refrig., washer, dryer, view, many rec. facilities, \$13,500. Bolwahn, 821-6278.

Coronado Club Activities

Jeanne Tonight; Martha Nov. 3

HAPPY HOUR tonight features the country western styling of Jeanne Rich and Friends on the bandstand. Club manager Pat Corcoran serves up a seafood platter for the buffet feature. Next Friday, Nov. 3, will see Martha Kaye and the Trio on the bandstand, beef kabobs on the buffet. To reserve your buffet ticket, call 265-6791 by mid-week.

OKTOBERFEST is tomorrow with a fantastic German food spread, entertainment by international-type folk dancers and music by Der Polka Schlingels. Ticketholders should enjoy it. Call the Club office right now to check on cancellations.

SINGLES MINGLE next Friday, Nov. 3, starting at 4:30 in the El Dorado room. It's the usual jumping party with music for dancing, a few door prizes, some munching goodies and lots of good company, unattached. The group plans a super big one on Dec. 1.

VARIETY NIGHT Saturday, Nov. 4, has a ventriloquist — Mark Doyle and friend — lined up to entertain the kids along with a movie about a short-changed cat — "The Three Lives of Thomasina." Super sandwiches are available at 6, the show starts at 7, and admission is free to members.

THE WOLFPACK travels to Tempe Nov. 30-Dec. 3 via charter bus to attend the Sun Devil Classic tournament. The trip includes bus fare, three nights lodging, tournament tickets, breakfasts, a cocktail party and a continuous party on the bus. All that goes for \$112 (dbl.) or \$144 (single). Joining the Wolfpack costs \$10. Call Pro Padilla, 4-3462, for more info.

TOASTMASTERS, The Beta Aloosters, meet at the Club Wednesdays from 12 to 1 for



ASSORTED WITCHES, goblins, spooks, monsters and ghosts are what Maria Diaz (1211) and young Chris Rumpf see in store for the kids attending the Club's Halloween party Tuesday starting at 6:30. A Chamber of Horrors with live dreadful creatures, games, movies, and goodies are all part of the festivities.

a catered lunch and sessions on self improvement through speech making. The group is seeking new members. Call Coleman Richardson, 4-7868, for more info.

SEASON PASSES for rides on the C-Club bus to all home Lobo basketball games are on sale at the office for \$16.80 — good for 15 rides to the games from the Club parking lot.

YOUNGSTERS interested in competitive swimming might enjoy joining winter training with the Coronado Aquatic Club coached by Reed Barnitz. Call Reed on 821-6932 for more info.

Property Management Group Meets November 9

The Sandia Chapter of the National Property Management Association meets Nov. 9 at 6 p.m. at KAFB Officers Club West. Speaker will be Brig. Gen. M.W. Baker, commander of Contract Management Division, Air Force Systems Command. For more info, contact Patte MacPherson (3411), 4-2540.

UPCOMING EVENTS — "Bring Back the Fifties" dinner dance Nov. 18; Sanado luncheon Nov. 14; Ski Club ski swap Nov. 9.

FRIDAY	SATURDAY
27—HAPPY HOUR Seafood Platter Buffet Adults \$4.95 Under 12 2.50 Jeanne Rich & Friends	1-4 Ski Club Dry Land School — — — OKTOBERFEST Cocktails 6 Dinner 6:30 Folk Dancers DER POLKA SCHLINGELS
Nov. 3—HAPPY HOUR Beef Kabobs Buffet Adults \$4.95 Under 12 2.50 Martha Kaye Trio — — — 4:30 Singles Mingle	Nov. 4—VARIETY NIGHT "The Three Lives of Thomasina" Supper 6 — Show 7 Free to Members

